

The Knowledge Bank at The Ohio State University
Ohio State Engineer

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Blasting Drilled Wells

to increase water supply

LESSON No. 10 OF THE BLASTERS' HANDBOOK

VERY frequently wells, even though drilled through known water-bearing strata, will not yield sufficient water. Only a few pores or crevices intersected by the drilling supply any water. Certain blasting methods will open up all of the fissures for a considerable distance in all directions thereby greatly increasing the supply of water.

But such blasting requires very careful procedure. For instance, questions arise as to the proper depth of the charge; the amount and kind of explosives to load; the methods of loading and firing charges, and other details associated with blasting.



Do you know how to make a "jack squib," or how to prepare a nitroglycerin charge to explode by means of an electric blasting cap, or how to make a dynamite "torpedo?"

The details of a great many blasting operations are fully described and illustrated in the Blasters' Handbook. You will run into some of these operations. Then the Blasters' Handbook will prove to be a friend indeed!

A copy of the Blasters' Handbook, already used in many of the largest engineering classes, can be obtained free by mailing this coupon.



E. I. DU PONT DE NEMOURS & CO., Inc.
Explosives Department, Wilmington, Delaware

Gentlemen:

Please send me a copy of your "Blasters' Handbook."

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When a full blooded American Indian was the world's champion athlete

When Jim Thorpe won the Pentathlon and Decathlon at the Stockholm Olympic Games in 1912, the world was electrified. By securing a majority of points in broad and high jumps, discus and javelin throwing, putting the shot, running races and dashes, Thorpe was awarded the title of World Champion.



THE 1928 Olympics will be in Amsterdam. One of its show places is the magnificent new Bank of the Netherlands Trading Co. No doubt this bank would be proud to have one of Holland's native sons win world fame similar to Thorpe's, but they do not believe in compelling clerks to practice marathons and weight lifting in their daily work.

You will find in this bank 24 Otis Elevators of the most modern type from the micro-driven passenger elevators that annihilate time and space

in their 100 foot lift, to smaller elevators and dumbwaiters that carry valuables and strong boxes, books and safes, ashes and food—elevators of every type and purpose—all products of Otis.

It should be a real thrill to visiting Americans to contemplate one of America's great industries as a necessary adjunct to the march of civilization—even in countries of the old world that were making history when American Indians were yet to look upon the face of a white man.

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THE trade marks shown above identify products that have won universal recognition as the standard for uniformity of quality and protection. Years of experience in the manufacture of building glass and constant laboratory tests are the reason for Mississippi supremacy.

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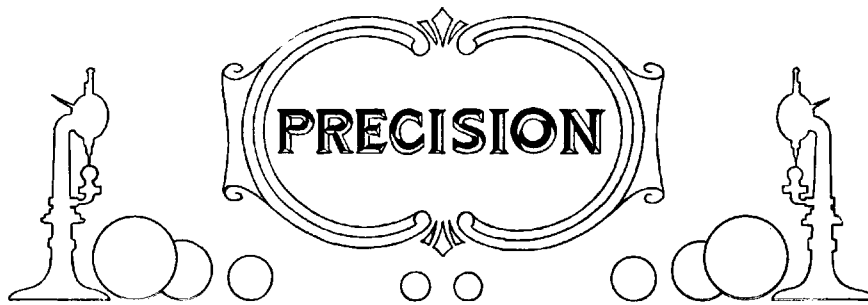
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*The Standard
is based on*

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One-fifth of a Tenth of a Thousandth of an Inch

A RATHER insignificant item in everyday student life—but in the making of New Departure ball bearings, a unit of measurement of real importance. The steel ball in a New Departure Ball Bearing has a sphericity as close to dimension as any standard known to man—far closer than anything else manufactured commercially.

To check its variation from perfect sphericity accurately would require a gauge capable of measuring *to the millionth of an inch!*

All parts of a New Departure are made to such precision limits, that the accumulated error of parts, ball races and balls, will not total more than two ten thousandths of an inch. Thus it is that the ball bearing can support most accurately the rotating shaft or spindle of a machine.

The next discussion will deal with the *strength* of the New Departure steel ball.

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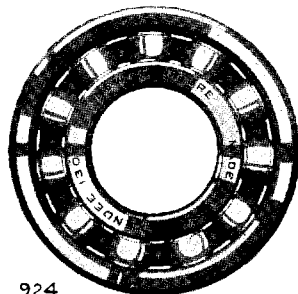
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New Departure



Ball Bearings

GAS

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THE cost of crude fuel goes far beyond its original purchase price. Unloading, storage, ash removal, spoilage, insurance, tied-up capital — all represent extra costs you can't overlook.

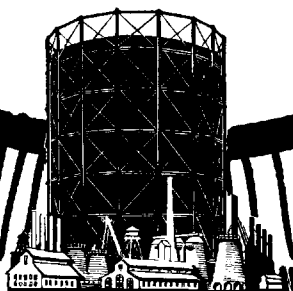
When you use gas you eliminate these extra and sizable charges — out go the scavengers of waste and spoilage.

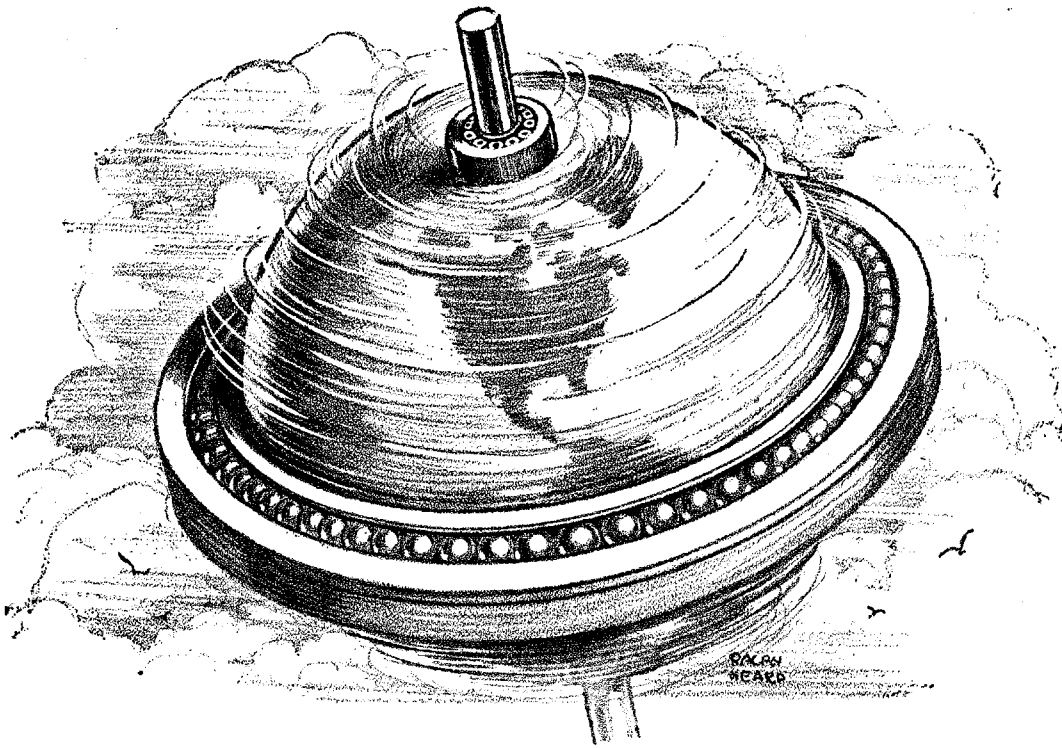
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Bearings and Grinding

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THE world's precision machinery and fast-moving vehicles depend for their efficiency and speed on ball and roller bearings. Anti-friction bearings by the millions are being produced in great plants employing thousands.

One of the major production operations—one that has made ball and roller bearing accuracy possible is "grinding." Batteries of Grinding Machines are to be found in every ball and roller bearing plant.

Many of these plants are equipped with Norton Grinding Machines. Many of them use Norton Grinding Wheels and Alundum Polishing Abrasives.

Norton Research Engineers, Chemical Engineers, Mechanical Engineers and Sales Engineers are serving this as well as many other industries, meeting present production needs and studying into ways and means of bringing about greater accomplishment in the days to come.

NORTON COMPANY

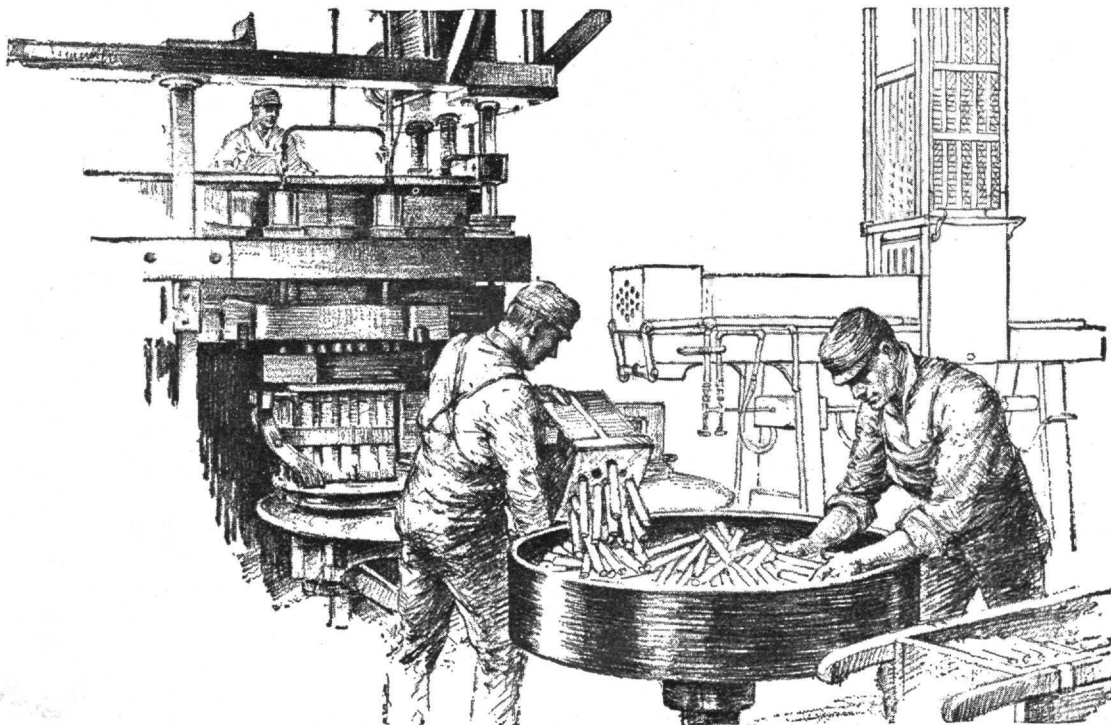
WORCESTER, MASS.

NORTON

Grinding Wheels
Grinding Machines



Refractories-Floor
and Stair Tiles



IT'S THE MAN THAT COUNTS

THE human element probably plays a more important part in the making of explosives than in any other manufacturing process conducted on a large scale. There is no machine in the great Hercules plants that has not a man for its master. Every motion it makes is watched. The results of its work are carefully checked. Nothing is ever taken for granted. No machine is looked upon as infallible.

For example, in the gelatin packing house a large machine fills paper cartridges with *Hercules Gelatin Dynamite. Although this machine works with almost positive precision and accuracy, every cartridge which comes from it is inspected twice to make certain that it is properly packed. One inspection takes place immediately after the

cartridge leaves the machine. Another before it is finally boxed for shipment.

The men who use Hercules Explosives know how dependable are the men who make Hercules Explosives. The Explosives themselves tell the story. In metal mine and stone quarry, at the bottoms of deep rivers and in the hearts of great mountains, wherever an engineer builds a city skyscraper, or a farmer blasts a ditch, Hercules Explosives live up to the name they bear.

• • • • •

**As its name suggests, Gelatin Dynamite is plastic. It is made by dissolving nitrocotton in nitroglycerin and combining with certain other materials called "dopes". It is used principally for shooting in hard rock and in water.*

HERCULES POWDER COMPANY

(INCORPORATED)

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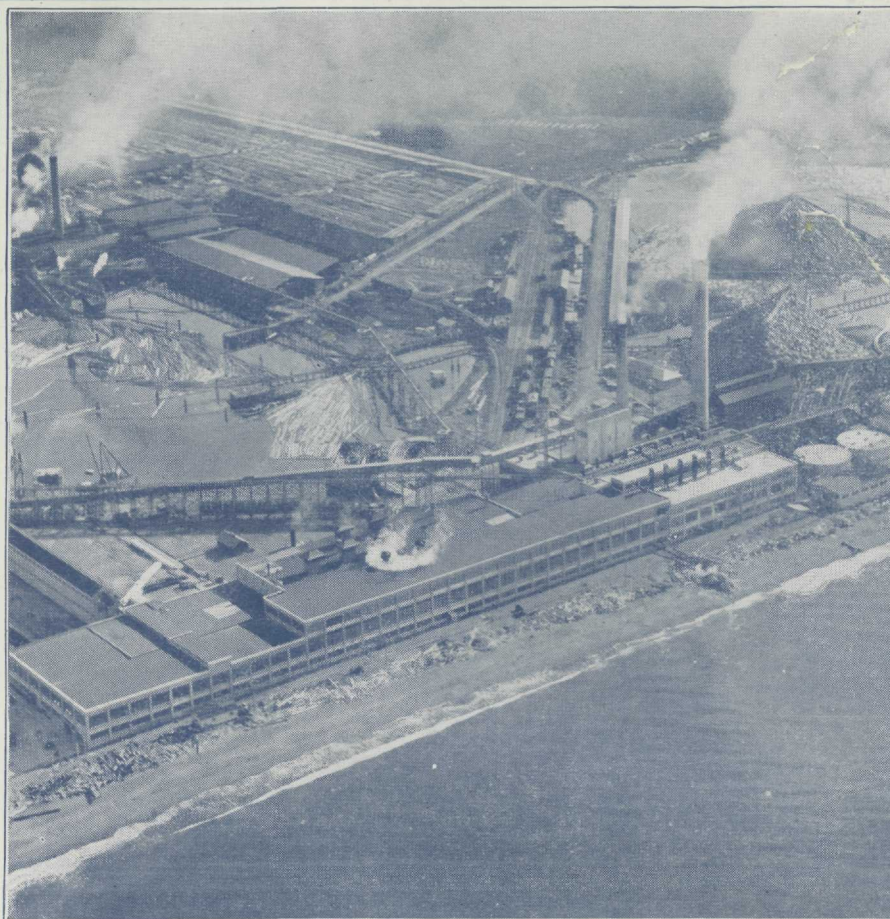
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YOUNGER COLLEGE MEN ON RECENT WESTINGHOUSE JOBS

Photo by Brubaker Aerial Surveys, Portland, Oregon.

Washington Pulp and Paper Mill

Where do young college men get in a large industrial organization? Have they opportunity to exercise creative talent? Is individual work recognized?

AT Port Angeles, Washington, stands the mill of the Washington Pulp and Paper Corporation—a mill that produces enough newsprint every day to make a sheet 10 feet wide and 1,000 miles long.

When this great industrial organization built a mill extension that almost doubled its capacity, Westinghouse, having already supplied elec-

trical equipment for the original plant, was called on to electrify the new unit. Difficult driving problems were met and solved by Westinghouse engineers—with individual motor drives up to 1000 horsepower, with refined control mechanisms, with the sectional paper machine drive that has revolutionized the making of this important product.

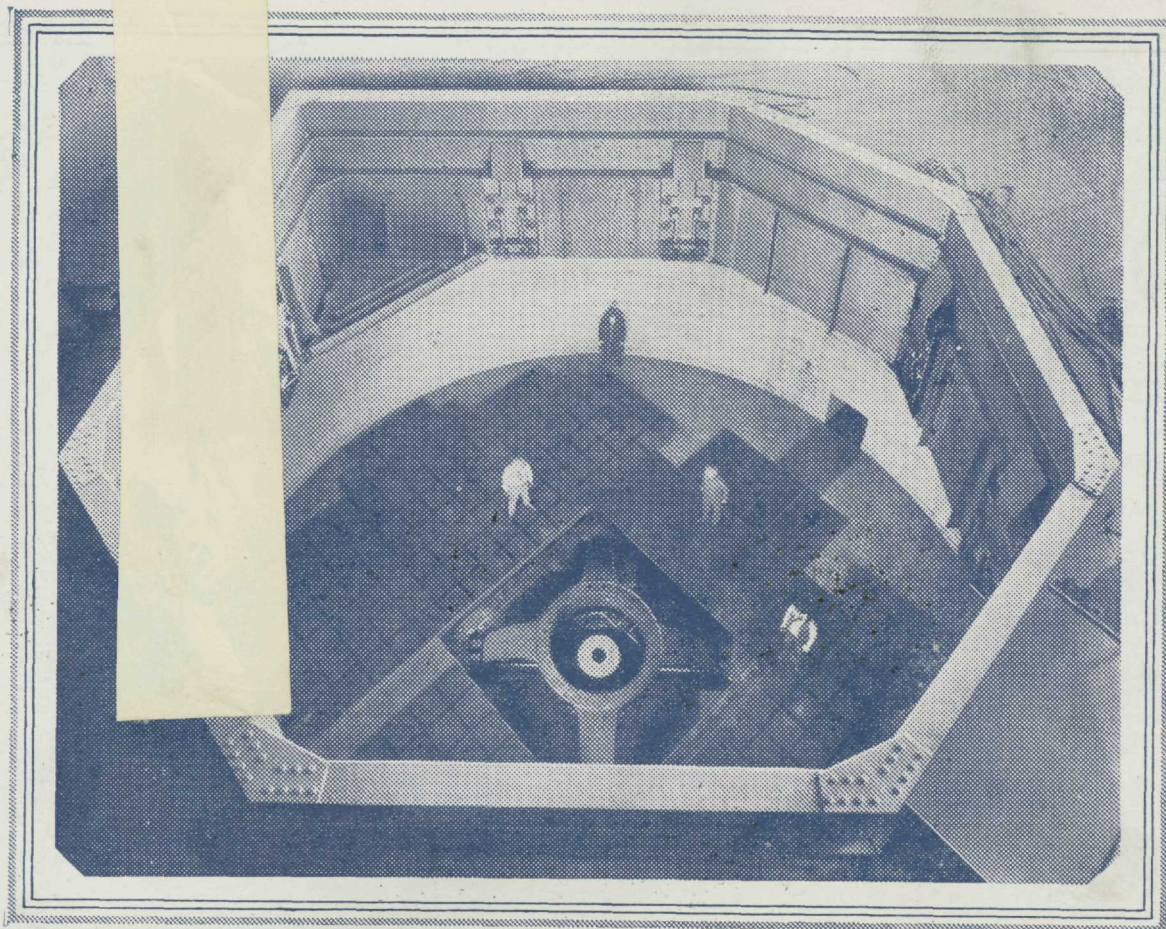
Big jobs go to big organizations. Westinghouse attracts

young men of enterprise and genius because it daily provides facilities and opportunities which smaller corporations can seldom offer.

The Washington Pulp and Paper Corporation's mill represents the most modern and scientific application of straight line production to the paper industry. Pulp wood enters one end of the long building on an electrically powered monorail carrier. It follows in a continuous line through the grinders, screens, mixers and jordan to the paper machine. At the other end the finished paper is rolled and wrapped for shipment. Power for every operation is supplied by electric motor.

Westinghouse





The Pit

Three feet of concrete—seven of sand—five more of concrete—all reinforced with steel—such are the walls of this underground chamber. The roof, a slab of steel rimmed with girders, is held in place by great steel wedges.

A military stronghold? No—a test pit at the Schenectady Works of the General Electric Company. Here the “test men”, young engineers, most of whom were in college only last year, help test the rotors of waterwheel generators for safe operation under emergency conditions. These rotors—some as large as 40 feet in diameter—are revolved at double the speed which will be demanded of them in normal service.

The pit controls, located in a building 300 feet away, are supplemented by ingenious listening and visual devices which give accurate indication of conditions in the pit at any instant.

Such elaborate precautions have been devised because of the immense size and power of generating apparatus which is now being built to answer the general demand for more electric energy. Scientists and manufacturers are establishing new standards of electrical production—building a heritage which will enable engineers of to-morrow to increase the usefulness of electricity far beyond to-day's limit.



General Electric's record for successful performance of its waterwheel generators is only one of the things that have given meaning and value to the G-E monogram, which appears on all the equipment built by the Company.

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